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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,527	04/20/2004	Dibyapran Sanyal	200400476-2 (LHGB 1509-49	2969
22879 7590 02/05/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			EXAMINER YAARY, MICHAEL D	
			ART UNIT	PAPER NUMBER
			2193	
			NOTIFICATION DATE	DELIVERY MODE
			02/05/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/827,527

Applicant(s)

SANYAL, DIBYAPRAN

Examiner

Michael Yaary

Art Unit

2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. Claims 1-20 are pending in the application.

#### ***Response to Arguments***

2. Applicant's arguments, filed 12/27/2007, with respect to claims 1-20 have been fully considered and are persuasive. The final rejection of claims 1-20 has been withdrawn.

#### ***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

As to claims 8-20, the claims are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

(i) Claims 8 and 20 are directed to software per se, not tangibly embodied, the claims being directed to an apparatus, failing to recite any hardware to execute the claimed computer instructions. Furthermore, claim 16 is directed to software per se, claiming the coded indicia, being directed only towards software.

(ii) Claim 15 is directed to "a computer readable medium or storage device," however, does not recite when executed by a processor, making the claim non-

statutory. A suggested amendment to overcome the rejection would be, "A computer readable medium or storage device storing coded indicia for causing a data processor arrangement to perform the method of claim 1 when executed by a processor."

(iii) Claims 9-14, and 17-19 are rejected for similar reasons as discussed for their respective parent claims, as they fail to present any limitations that resolve the deficiencies of the claim from which they depend.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 7-11, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. (hereafter Hughes)(US Pat. 6,519,768) in view of Bharadwaj (US Pat. 5,894,576).

6. Hughes and Bharadwaj were cited in the previous office action dated 09/28/2007.

7. **As to claims 1 and 8**, Hughes discloses identifying a set of target instructions semantically equivalent to a given source instruction (Column 2, lines 5-8 disclose

utilizing a template and applying it to block of target instructions corresponding to a particular source code instruction, and doing so for each source code instruction; thus identifying semantically equivalent target and source instructions.); and

Assigning an identifier to one or more of said target instructions for use by a code analyzer in scheduling the processing of said set of target instructions (column 3, lines 57-65).

8. Hughes does not disclose identifying data dependencies in said target instruction by analyzing the set of target instructions and the identifier assigning is done in accordance with the identified data dependencies.

However, in an analogous art, Bharadwaj discloses disclose identifying data dependencies in said target instruction by analyzing the set of target instructions and the identifier assigning is done in accordance with the identified data dependencies (Column 6, lines 57-64 disclose analyzing for data dependencies in the instructions; and thus combined with Hughes would allow for identifiers to be assigned based on the identified data dependencies.).

9. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hughes, by identifying data dependencies, as taught by Bharadwaj, in order to increase the overall efficiency of translating code, as one would be motivated to make the combination for the benefit of reducing the number of execution cycles needed as a result.

10. **As to claims 2 and 9**, the combination of Hughes and Bharadwaj disclose the set of target instructions is identified in a translation template associated with a given source instruction, said template being a component of a translator program for translating instructions in the source format into instructions in the target format (Hughes, column 1, line 55-column 2, line 19 and column 2, line 66-column 3, line 8).

11. **As to claims 3 and 10**, the combination of Hughes and Bharadwaj disclose the analysis of the target instructions is carried out prior to the compilation of the translation templates into said translator program (Hughes, abstract lines 2-4 and column 2, line 66-column 3, line 8.).

12. **As to claims 4 and 11**, the combination of Hughes and Bharadwaj disclose the identifiers are assigned to said target instructions prior to said translator program being compiled (Hughes, column 3, line 57-column 4, line 5).

13. **As to claims 7 and 14**, the combination of Hughes and Bharadwaj disclose each translation template is associated with a corresponding analysis routine that generates said code for scheduling the execution of said translated code (Hughes, column 2, line 66-column 3, line 65, disclose a system for analyzing templates for adding or removing functions, thus resulting in a set of binary templates used in the code translation

process; thus being analogous to the analysis routine used to in the template analyzing of the instant claims.

14. **As to claim 15**, the combination of Hughes and Bharadwaj disclose a computer readable medium or storage device storing indicia for causing a data processor arrangement to perform the method of claim 1 (Inherent Hughes, column 1, line 49-column 2, line 20 as some sort of software implemented computer program would be needed to perform the method.).

15. **As to claim 16**, Hughes discloses a binary code translator for translating binary code from a source format to a target format for execution on a target processor (abstract), the translator comprising a computer-readable medium or storing device storing coded indicia adapted to be read by a data processor arrangement, the coded indicia including:

A set of translation templates (column 1, line 55-column 2, line 19 and column 2, line 66-column 3, line 8), each template arranged for providing a set of target format instruction which together are semantically equivalent to an associated source format instruction (Column 2, lines 5-8 disclose utilizing a template and applying it to block of target instructions corresponding to a particular source code instruction, and doing so for each source code instruction; thus identifying semantically equivalent target and source instructions.);

A set of transformation routines arranged to transform data from a source format instruction into the appropriate parts of each target format instruction provided by the corresponding translation template (Column 3, line 65-column 4, line 5 disclose utilizing the translation templates to perform a translation process (transformation routine), to transform the data of a source format into a target format).

16. Hughes does not disclose a set of analysis routines arranged to identify data dependencies in a template for causing generation of data for use by a code scheduler in scheduling the execution of translated code on said target processor.

However, Bharadwaj discloses a set of analysis routines arranged to identify data dependencies in a template for causing generation of data for use by a code scheduler in scheduling the execution of translated code on said target processor (Column 6, lines 57-64 disclose analyzing for data dependencies in the instructions using a data dependence analyzer. Bharadwaj does not explicitly recite analysis routines used in identifying data dependencies; however, this would nonetheless be obvious in that the data dependence analyzer would utilize certain routines in order to identify data dependencies.).

17. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hughes, by identifying data dependencies, as taught by Bharadwaj, in order to increase the overall efficiency of



translating code, as one would be motivated to make the combination for the benefit of reducing the number of execution cycles needed as a result.

18. **As to claim 17**, the combination of Hughes and Bharadwaj disclose the binary code translator arranged to operate dynamically at run time of an application program being emulated (Hughes, column 3, line 66-column 4, line 5).

19. **As to claims 18 and 19**, the combination of Hughes and Bharadwaj disclose the code analyzer schedules the processing of said set of target instructions in accordance with the identified data dependencies (Bharadwaj, column 4, line 61-column 5, line 14 and column 6, lines 57-64).

20. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes in view of Bharadwaj as applied to claims 1 and 8 above, and further in view of Mochizuki (US Pat. 6,016,396).

21. **As to claims 5 and 12**, the combination of Hughes and Bharadwaj disclose the limitations of the claims with respect to independent claims 1 and 8 above, but is silent to processing the translated code in a parallel processing environment.

However, in an analogous art, Mochizuki discloses a code conversion system operating in a parallel processing environment (column 1, lines 7-12).

22. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the code scheduling and translation method of the combination of Hughes and Bharadwaj, by utilizing a parallel processing environment, as taught by Mochizuki, in order to simultaneously execute multiple code translations. One would be motivated to make the combination as a high speed processing system would be maintained.

23. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes in view of Bharadwaj as applied to claims 1 and 8 above, and further in view of Rasbold et al (hereafter Rasbold)(US Pat. 5,202,975).

24. **As to claims 6 and 13**, the combination of Hughes and Bharadwaj disclose the limitations of the claims with respect to independent claims 1 and 8 above, but is silent to data dependencies are represented by a directed acyclic graph, and the identifying step identifies said dependency signaling an appropriate edge in the set of target instructions to said code analyzer.

However, in an analogous art, Rasbold discloses data dependencies are represented by a directed acyclic graph, and the identifying step identifies said dependency signaling an appropriate edge in the set of target instructions to said code analyzer (Column 9, lines 11-29 disclose a dependency DAG utilizing edges indicating dependencies between code.).

25. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Hughes and Bharadwaj, by utilizing a directed acyclic graph, as taught by Rasbold, in order to effectively model the code to be scheduled and provide a partial ordering of the code as well.

26. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes.

27. **As to claim 20**, Hughes discloses an apparatus for translating machine instructions in source code into equivalent target instructions of a code of a target platform, wherein the source code differs from the code of the target platform (abstract), said apparatus comprising:

A source of binary translation templates for mapping instructions in the source code into a set of instructions in the code of the target platform (abstract and column 1, lines 55-58);

A dynamic binary translator arranged to be responsive to the machine instructions (column 3, lines 42-53).

28. Hughes does not explicitly disclose a fill and analysis routine generator arranged to be responsive to the templates for generating fill and analysis routines for identifying fillable positions in a template by parsing the template and for generating code to extract and deposit fields from the machine instructions in source code into a precompiled template.

However, Hughes discloses a system for analyzing templates for adding or removing functions, thus resulting in a set of binary templates used in the code translation process (column 2, line 66-column 3, line 65); thus being analogous to the fill and analysis routines used to in the template analyzing of the instant claim. Hughes does not explicitly teach parsing of the template, however, parsing is well-known knowledge in the art, and thus one of ordinary skill in the art at the time of the invention would have been able to utilize parsing in the template analyzing of Hughes, in order to further break down the code, as when parsed would provide code that can be interpreted more easily.

29. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the template analyzing process, as taught by Hughes, being analogous to the fill and analysis routines of the templates, for the benefit of creating a set of compiled templates that efficiently perform a translation process.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Yaary whose telephone number is (571) 270-1249. The examiner can normally be reached on Monday-Friday, 8:00 a.m - 5:00 p.m..


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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